APPENDIX B

COLLECTIVE PROTECTION FOR FACILITIES

B-1. Collective Protection Design Strategy.

A chemical, biological, or radiological (CBR) airborne threat can come from a wartime attack, terrorist attack, or from an industrial accident. Protection of personnel during these events can be achieved by evacuation from the affected area, collective protection sheltering, or individual protective equipment (IPE).

a. *Use of CBR Detectors*. Theoretically, automatic detectors can be used to initiate protective actions such as shutdown of ventilation systems, closing outside air intakes, or turning on filtration systems. Detection of radiological agents can be performed with off-the-shelf equipment. Current biological detection technology requires a minimum delay of approximately 15 minutes to detect the presence of biological agents. Practical application of chemical detection is limited by shortcomings in response time, false alarms, broad spectrum capability, maintenance requirements, cost, and the quantity of sensors needed at air intake locations. For wartime threats, audible and visual indicators along with detection are used to initiate protective actions. For terrorist threats, no audible and visual indications announce the attack, other than incapacitation of people. Thus, application of detectors for terrorist threats should be limited to the following uses: first entry determination by first responders, monitoring casualties before medical treatment, determining the extent of the hazard, and determining when protective measures are no longer required.

b. *Wartime Threat*. For large scale wartime chemical or biological attack, the facility will be designed to provide a toxic-free area (TFA) where personnel can function without IPE. To resist the penetration of agents into the TFA from long duration exposure, a wartime facility must have a CBR overpressure filter system that prevents penetration of agents at a wind speed of 40 km/hr (25 mph). Also required are an outdoor or integral contamination control area (CCA) for decontamination of personnel and an airlock that prevents contaminated air from entering the TFA during ingress and egress of personnel.

c. *Terrorist Threat*. For facilities that require continuous operation during a short duration threat with little or no warning, such as a terrorist attack, continuous filtration of the ventilation air intakes is required. To resist the short duration penetration of agents into the TFA, a CBR filtration system will be required to provide an overpressure that prevents the penetration of agents through the TFA envelope at wind speeds of 12 km/hr (7 mph). This wind speed condition is most favorable for directing a plume of agent with minimum dispersion toward an outside air intake.

d. *Industrial Accidents*. To provide passive protection for an exposure of short duration, sealing measures at the facility envelope and closing outside air intakes will provide limited protection to the occupants for a short period of time. The level of protection provided by passive

means is time dependent. To provide collective protection for a facility that requires continuous operation either closing of the outside air intakes during the release, or protecting the air intakes with a CBR filtration system is required.

B-2. Facility Collective Protection Classification.

Existing and new facilities designated to provide collective protection (CP) can be separated into the three major classes of protection described below.

a. *Class I - Filtration with Pressurization*. This class of protection is applicable against wartime military threats that produce a large-scale release of agents over an extended period of time. Effective protection requires a CBR filtration and overpressure system that resists a continual large-scale threat in a 40-km/hr (25-mph) wind. The filtration and pressurization system may be operated continuously or maintained in a standby mode; i.e., energized only when there is a known threat of attack. An internal or external CCA and an ingress and egress airlock are required.

b. *Class II - Filtration with Little or No Pressurization*. This class of protection is applicable to a terrorist attack with little or no warning that produces a short duration small-scale release of agent. Outside air intakes will be protected by continuously operating CBR filtration units. The filtration system will be sized for the normal facility air intake requirements and need provide little or no facility overpressure. An airlock is not required, but a vestibule that acts as an airlock is desirable.

c. *Class III - Passive Protection*. This class of protection is applicable to a short duration release such as an industrial accident. Protection is achieved by closing building openings and turning off ventilation systems. The release must be detected and adequate warning must be issued before protective measures can be applied.

B-3. Guidance.

a. *Designation of CBR Protected Facilities*. The commander or authority having jurisdiction determines if facilities are susceptible to a CBR threat and which facilities require collective protection.

b. *Existing Facilities*. Existing facilities designated to have a Class I CP overpressure system will be modified in accordance with Appendix C. Existing facilities designated to have a Class II CP system with little or no pressurization will be modified in accordance with Appendix D. Expedient passive protection CP sealing measures for existing Class III facilities will be based on the recommendations in ERDEC-TR-336.

c. *New Facilities*. New facilities designated as a Class I CP overpressure system, or required to incorporate design features that ease future installation of a CP system, will incorporate the

requirements in Appendix C. Requirements for collective protection for wartime facilities which include an integral CCA will be designed in accordance with TM 5-855-1 and other criteria as designated by the using command or authority having jurisdiction. New facilities designated as a Class II CP system or required to incorporate design features that ease future installation of a CP system will incorporate the requirements in Appendix D.

B-4. Additional Assistance.

Additional assistance is available from the Corps of Engineers Protective Design Center at the address provided below.

U.S. Army Engineer District, Omaha
ATTN: CENWO-ED-S
215 North 17th Street
Omaha, NE 68102-4978

Telephone: (402) 221-4925/4918